Perceptual and Motor Skills, 1992, 74, 296-298. © Perceptual and Motor Skills 1992

CRITERION VALIDITY FOR ROTTON'S PARALOGIC TEST: BELIEFS OF FORBIDDEN KNOWLEDGE MAY NEGATIVELY AFFECT INFERENTIAL PROBLEM SOLVING[1]

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Summary.—The hypothesis was tested that belief in restricted or exclusionary knowledge interferes with strong inferential processing. Scores on Rotton's Paralogic Test, multiple-choice examinations (mutually interactive items), and the belief clusters from the Personal Philosophy Inventory were factor analyzed for 55 part-time university men and women. Subjects who endorsed more items concerning forbidden knowledge (i.e., there are some things that Science should not investigate) displayed poorer logical and inferential performance (25% explained variance). These results suggest that such beliefs may limit cognitive exploration of certain conceptual domains.

Beliefs are infused with a significant affective component that widens the stimulus generalization curve and reduces the capacity for the fine discrimination that is required for inferential thinking (Persinger & Makarec, 1991; Tucker, 1970). Forbidden and exclusionary beliefs, embodied in statements such as "There are some things that Science should not investigate" or "The existence of God cannot be explained by Science," would be expected to impair significantly logical and inferential processes and to increase cognitive rigidity (Persinger, 1987). If these hypotheses were correct, then people who endorse exclusionary beliefs should also display poorer inferential skills and obtain lower grades on multiple-choice examinations the items of which depend significantly upon these processes.

In the present study 20 men and 35 women (ages 20 to 45 years; mean = 27) who were enrolled in a first-year psychology evening course were given four multiple-choice examinations, Rotton's 16-item Paralogic Test (obtained from the author, Dr. J. A. Rotton, Department of Psychology, Florida International University, North Miami, Florida 33181), and the Personal Philosophy Inventory (Persinger & Makarec, 1987) which was given during September. The first two examinations were given in December while the second two were given the following April. The Paralogic Test was administered immediately before the administration of the third examination.

For this study, only the items that constituted the beliefs clusters (four to five items per cluster) were extracted from the Personal Philosophy Inventory; the clusters which have been previously determined by factor analyses were exotic beliefs, religious beliefs, extreme religious beliefs (Persinger

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& Makarec, 1990), and exclusionary beliefs. In addition to the two items noted in the first paragraph, the latter cluster included "Belief in Science and belief in God are not compatible" and "Animals should not be killed for the benefit of mankind." Belief scores were the percentage of endorsements of the items in the cluster.

Each multiple-choice item contained five options, one or two of which were combinations of the other three or four; stated alternatively, although there was only one correct answer per item, the correct answer could be a combination of items. There were 40 to 41 items per examination, and the score was the percentage correct. Two measures were obtained from the Paralogic Test: the accuracy for the item as a function of type of content (8 mundane or normal vs 8 paranormal items) and the total accuracy (absolute score of 16). Because there were no sex differences ($p > .05$) on any of these measures, the two groups were combined.

After determining the basic numerical moments (means, standard deviations, etc.) for the group, correlation analyses were completed among the belief, paralogic test, and examination scores. Additional factor analyses were completed among the four belief clusters, the average test score, and the total correct for the paralogic test. The means and standard deviations (in parentheses) were for average examination score 55% (10%), total Rotton score 8.5 (2.5), Rotton "type" score (normal content items correct minus paranormal content items correct) 0.6 (1.6), exotic beliefs 61% (26%), traditional religious beliefs 47% (25%), extreme religious beliefs 17% (18%), and exclusionary beliefs 47% (26%). All analyses were completed by SPSS^x software on a Vax 4000 computer.

Intercorrelations among the four examination scores ranged between 0.60 and 0.78. The strength of endorsement of exclusionary (forbidden) beliefs was significantly and negatively correlated with the average examination scores ($r = -.51$). Whereas the general inferential ability (total Paralogic Test score) was positively associated ($r = 0.41$, $p < 0.01$) with examination scores, differential accuracy for the type of item (paranormal vs normal) was not (-.19). Of the four belief clusters, only the correlation between exclusionary beliefs and the total logical inference score was statistically significant ($r = -0.30$, $p < 0.05$).

Two factors emerged after the varimax rotation. The first (eigenvalue = 2.00) was loaded by religious beliefs (0.67), extreme religious beliefs (0.87), and exotic beliefs (0.71), while the second was loaded exclusively by examination score (0.73), the total Paralogic score (0.70), and exclusionary beliefs (-0.80). Partial correlation analyses showed that the correlation between forbidden beliefs and the Paralogic Test scores were no longer significant ($r = -.13$) when the variance associated with examination scores was held constant; the other combinations were not appreciably different from the

zero-order correlations. These results indicate that the source of variance associated with examination performance was responsible for the significant correlation between belief and Paralogic Test analyses.

These results indicate criterion (external) validity for Rotton's 16-item test. Neither religious nor exotic beliefs *per se* adversely affected either inferential thinking or this form of multiple-choice accuracy. However, endorsement of items from which one could infer strong beliefs in exclusionary or forbidden knowledge restricted examination performance and the inferential process and negatively affected problem solving. Stated more positively, these individuals should respond optimally in situations where options are clear and mutually exclusive. Whereas problems that required bivariate solutions would be completed quickly and accurately, problems that required multivariate solutions would be difficult and might even appear intractable.

The persistence of this correlation, even though the measure of beliefs occurred months before the examinations, suggests that formal lecturing may not alter either beliefs or exclusionary domains of knowledge and have no influence on inferential problem solving. These results indicate that acquisition of facts in university settings may not reflect changes in attitudes or beliefs and may help explain the absence of change in superstitious, religious, and exotic beliefs between first- and fourth-year university students (Persinger & Makarec, 1990).

If this conclusion is valid, then educational and national programs that promote indiscriminant acquisition of potentially dangerous technologies by individuals from groups who profess extreme beliefs should be reevaluated. The common assumption that acquisition of technical knowledge within an open political environment facilitates the imitation of its characteristics may not be correct. Instead, the utilization of technology and scientific facts, acquired without modification of belief or of self-concept, would be driven by the affective components of the person's religious beliefs at critical points within the series of cognitive processes that determine decisions (Persinger & Makarec, 1991).

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Accepted January 28, 1992.